

**ABSTRACT OF THE DISCLOSURE**

When changing a dopant species in an implantation tool, typically a clean process is performed to reduce cross-contamination, which is considered a major issue in implant cycles applied in advanced CMOS processes. Especially, the employment of an implanter previously used for heavy ions may generate increased cross-contamination when subsequently used for boron or phosphorus implants at moderate energies. A clean implant process using xenon gas may effectively reduce this cross-contamination at shorter process times compared to a conventional argon clean step.